Rebuild Hawaii

Hawaii Performance Contracting Workshop 2003

Hawaii ESPC Projects

What has Been Done & Lessons Learned

City & County of Honolulu

Honolulu Hale

Scope

- City Hall and Annex Buildings
- Central Cooling Plant & Cogeneration System
- Lighting Retrofit - Office & Historic
- AHU Replacements / Upgrades
- City LAN Networked Building Control System

Financing

- Bond - Energy Program Funded
- Electric Utility Rebates

Status

- Central Plant/ Lighting Completed 6/02
- Cogeneration Unit online planned for 4/03

Allyn Lee - DDC Project Engineer

City & County of Honolulu

Honolulu Hale

Benefits

- Improved work environment with additional cooling capacity, temperature control and better lighting.
- New reliable equipment
- Flexible Equipment Scheduling
- Data for Commissioning / Diagnostic Work
- 39% reduction in energy usage

Lessons

- Adapted existing Contracts Administration methods (design / construction / services)

Improvements

- Include C&C CAD & Construction standards
- “One-Time Review” building permit procedures

Allyn Lee - DDC Project Engineer

City & County of Honolulu

Traffic Signal Systems

Scope

- Over 400 Intersections on Oahu
- LED Signal Module Retrofit (Red / Green)
- TraffiCenter Lighting Retrofit

Financing

- Bond - Energy Program Funded
- Electric Utility Rebates

Status

- Completed 10/02

Allyn Lee - DDC Project Engineer

City & County of Honolulu

Traffic Signal Systems

Benefits

- Improved Public Safety
- Increase productivity through reduced maintenance and emergency call outs
- 45% reduction in overall energy usage
- Correction of Metering/Billing issues

Lessons

- Contractors with Task Specific Experience
- Close installation coordination to resolve existing condition situations in the field.

Improvements

- Independent Consultant to review ECMs
- Equipment & Construction Subcontractor Bidding
- Utilize the Availability of Third-Party Financing

Allyn Lee - DDC Project Engineer

County of Hawaii

County Building

Scope

- New Chillers
- Re-configured Chilled Water Plant Piping
- Schedule & Bypass Control
- Airflow Improvement in Council Chambers
- Energy-Efficient Lighting Retrofit

Financing

- Self-Funded - Energy Program
- 10 years - Municipal Lease

Status

- Completing 6 years of Guarantee

Ray Carr - Energy Manager

County of Hawaii

County Building

Benefits

- **Improved & More Reliable Air Conditioning & Lighting Systems**
- **Replaced existing Breakdown Maintenance with full-service Preventative Maintenance**
- **Flexible Time Scheduling**
- **Significant Energy Usage & Demand Reduction**

Lessons

- **Be very clear with how Rebates will apply**

Ray Carr - Energy Manager

County of Hawaii

Phase I & II

Scope

- Energy-Efficient Lighting for Police & Fire Facilities throughout the Big Island
- New Chiller Plants at Hilo & Kona Police Stations. Some new Air Handlers.
- Improved Air Conditioning Control at Hilo & Kona Police Stations

Financing

- 10 yr. - Self-Funded - Municipal Lease - Energy Programs w/ Additional work funded by Bond

Status

- Ph. I - Completing 3 years of Guarantee
- Ph. II - Completed 1 year of Guarantee

Ray Carr - Energy Manager

County of Hawaii

Phase I & II

Benefits

- **Improved & More Reliable Air Conditioning & Lighting Systems**
- **Replaced existing Breakdown service with full-service Preventative Maintenance**
- **Significant Energy Usage & Demand Reduction**
- **Solved Hilo Dispatch Room A/C Deficiencies**

Lessons

- **ESPC is a very positive way to improve infrastructure and save energy**

Ray Carr - Energy Manager

County of Kauai

Various County Facilities

Scope

- Energy-Efficient Lighting Retrofit throughout various locations
- Centralized controls at Civic Center

Financing

- Self-Funded - Energy Program
- 10 years - Municipal Lease

Status

- Finalized 10-year Payout based upon stipulated savings projection

Glenn Sato - Energy Coordinator

County of Kauai

Various County Facilities

Benefits

- Improved work conditions
- Improved recreational conditions
- Improved reliability of lighting systems

Lessons

- Maintenance Savings is pivotal in allowing for work in Wastewater and Water Departments
- Partnering is crucial

Glenn Sato - Energy Coordinator

University of Hawaii Hilo

Scope

- University Campus with over 50 buildings
- Lighting Systems Retrofit
- High Efficiency Chiller / Tower / Pumping
- Mechanical Systems Repairs
- On-Site Building Specialist

Financing

- 10 year Commercial Lease

Status

- Completed 1997
- Ongoing Service until 2007

Jun Haruki - Project Engineer

University of Hawaii Hilo

Benefits

- Improved Lighting Quality & Uniformity
- Greatly Reduced Service Backlog
- Chiller Loop Expansion (Campus Center & Student Services off of Air-Cooled Chillers)
- Improved environmental controls including remote scheduling

Lessons

- Discussion of financing options early in Process
- Flexibility in dealing with operational issues

Improvements

- Spend more time on maintenance scopes & roles
- Include Critical Systems Spares Review

Jun Haruki - Project Engineer

University of Hawaii Community Colleges

Kauai Community College

Scope

- New Chillers & Variable Primary Chilled Water Loop Pumping
- Improved Air Conditioning Control with central DDC System
- Power Factor Correction

Financing

- Capital Funding

Status

- Completing 3rd Year of Guarantee

Dien Truong - Project Manager

University of Hawaii Community Colleges

Kauai Community College

Benefits

- **Improved & More Reliable Air Conditioning Systems**
- **Replaced existing Breakdown service with full-service Preventative Maintenance**
- **Significant Energy Usage, Demand & Billing Reduction**

Lessons

- **Never give up on Performance Contracting**

Dien Truong - Project Manager

University of Hawaii Community Colleges

Honolulu Community College

Scope

- **New Chillers, Pumps & Primary-Secondary Chilled Water Loop Pumping**
- **Improved Air Conditioning & Variable Speed Control with central DDC System**
- **Chemical-Free condenser water treatment**
- **New Window AC Occupancy Sensors**

Financing

- **Capital Funding**

Status

- **In 2nd Year of Guarantee**

Dien Truong - Project Manager

University of Hawaii Community Colleges

Honolulu Community College

Benefits

- **Improved & More Reliable Air Conditioning Systems**
- **Replaced existing Breakdown service with full-service Preventative Maintenance**
- **Energy Usage & Demand Reduction**

Lessons

- **UH Procurement process requires patience**

Dien Truong - Project Manager

HAWAII HEALTH SYSTEMS
CORPORATION

"Touching Lives Everyday"

Scope

- Healthcare System with ten facilities on five different islands.
- Cogeneration to meet 80% of facility electrical needs, 100% of facility hot water load, and supplement chilled water production via absorption chiller.
- Air conditioning system improvements include high efficiency chillers and variable volume chilled water operation.

Financing

- Customer furnished financing via municipal lease

Status

- Kona Community Hospital substantially complete. Chiller retrofit complete early 2002. Cogeneration system fully operational February 2003.

HAWAII HEALTH SYSTEMS
CORPORATION
"Touching Lives Everyday"

Status (cont'd)

- Hilo Medical Center 80% complete. Cogeneration system scheduled to go on line April 2003
- Kauai Veteran's Memorial Hospital 40% complete. Cogen system scheduled to go on line June 2003.
- Maui Memorial Medical Center and Samuel Mahelona Memorial Hospital in development.

Benefits

- Cogeneration systems provide for additional redundancy of electrical systems.
- New equipment (chillers, pumps, cooling towers, lighting, etc.) replaced aging equipment without capital funds expenditure.
- New energy management systems installed to allow for improved control and monitoring of electrical and mechanical systems throughout each facility.

HAWAII HEALTH SYSTEMS
CORPORATION
"Touching Lives Everyday"

Benefits (cont'd)

- **Energy savings reduce demand on hospital electrical distribution system, providing additional expansion capacity.**
- **Comfort and maintenance problems reduced with upgrades to building and equipment.**
- **Positive cash flow throughout term of contract.**

Lessons

- **Economics of cogeneration are better with systems sized for electrical and thermal baseload.**
- **Synergistic benefits from combined effects of upgraded central plant, controls, and cooling load reduction.**
- **Detailed engineering uncovers unresolved problems in original design - Upgrades can improve performance.**

State of Hawaii - The Judiciary

Judiciary Courthouses

Scope

- Five Buildings on Maui and Oahu
- Over 500,000 square feet of Office, Meeting and Courtroom facilities
- Lighting Retrofit

Financing

- 10 year Third-Party Municipal Lease

Status

- Contract Award 10/02
- Construction Award 2/03

Jonathan Wong - Contracts Administor

State of Hawaii - The Judiciary

Judiciary Courthouses

Benefits

- Improve work environment with higher Lighting Levels and better color rendering
- Eliminate unoccupied lighting of rooms with Occupancy Sensors
- Reduce Maintenance requirements with standardization of lamp & ballasts.

Lessons

- Participation in Team Meetings essential
- Building Manager /User Meetings
- Sample Retrofit was Beneficial

Improvements

- Set internal deadlines for review/comments

Jonathan Wong - Contracts Administor

State of Hawaii - Department of Defense

Hawaii Army National Guard

Scope

- 40+ Facilities on Oahu, Big Island, and Kauai
- Lighting Retrofits
- Air Conditioning Plants
- Waste Heat Recovery for Hot Water Systems
- Photo-Voltaic Electrical Generation

Financing

- Proposed Third-Party Municipal Lease
- Electric Utility Rebates

Status

- Energy Audits Complete
- ECM selection and feasibility analysis

Ken Stacy - Energy Manager

State of Hawaii - Department of Defense

Hawaii Army National Guard

Benefits

- **Need Capital Improvements to Replace Failing A/C systems**
- **Improved work environment with Upgrade of Lighting Systems**
- **Improve Site and Asset security with lighting systems**
- **Provide Central Control and monitoring of Energy and Environmental Conditions**

Lessons

- **Full-time person needed to facilitate coordination with Multiple Users / ESCO**

Ken Stacy - Energy Manager

United States Air Force

Hickam Air Force Base

Scope

- **Two Task Orders:**
  - **HVAC Equipment & Control Retrofit**
  - **Energy-Efficient Lighting Retrofit**
  - **Water Conservation**
  - **Radiant Barrier**
  - **Solar Attic Fans**

Financing

- **Self-Funded - Energy Program**

Status

- **Task Order 1 - 2nd Year of Guarantee**
- **Task Order 2 - Implementation Complete Feb. '03**

Dave Stiner - Energy Manager

United States Air Force

Hickam Air Force Base

Benefits

- **Improved & More Reliable Air Conditioning Systems**
- **Improved control & diagnosis of Air Conditioning systems**
- **Improved comfort for residents**
- **Electricity, Water & Sewage - Usage & Demand Reduction**

Lessons

- **9/11 Affects Everything**

Dave Stiner - Energy Manager

United States Army Medical Command

Tripler Army Medical Center

Scope

- Chilled Water Pumping Improvements
- Hot Water Recirc. Loop Steam Heat Exchanger
- Chilled Water Loop Extension
- Air Handler Upgrades (VFD/Static/Motors)
- Computer Room DX to Chilled Water Cooling

Financing

- 23 year Third-party Lease
- Utility Rebates

Status

- Phase 1 Completed 1/03
- Phase 2 in Proposal Stage

Myron Oh - Facilities Director

United States Army Medical Command

Tripler Army Medical Center

Benefits

- **Mission Critical Capital Improvements Funded by Energy Savings**
- **First Task Order Proved working relationship, worked out processes and demonstrated Improvements work**
- **Provided infrastructure for follow on projects**
- **Improved Exterior Aesthetic Conditions**

Lessons

- **Vision of Facilities needs & goals communicated**
- **Trust and clear communications during project development**

Improvements

- **Clearly define payment / funding processes**

Myron Oh - Facilities Director

United States Navy

Naval Region Southwest

Scope

- Approximately $20 Million
- Technologies:
  - HID Lighting
  - Controls
  - HVAC
  - Micro-turbines
  - 750kW PV Array
  - Irrigation

Financing

- ESPC
- State Incentives
- Office of the Secretary of Defense

Chris Lippert- Deputy Energy Program Manager, Tetra Tech EMI

United States Navy

Naval Region Southwest

Benefits

- Better Working Conditions
- No Capital Outlay for Projects
- Implement Innovative Projects
- Quality Projects

Lessons

- The Activity Must Participate in the Process
  - Guide Audits
  - Decide What Qualifies as Savings
  - Involve Stakeholders Early in the Process
  - Take an Active Management & Review Role
  - Get Expert Help With M&V Planning / Execution
  - Plan Post Construction Roles for the Life of the Contract

Chris Lippert- Deputy Energy Program Manager, Tetra Tech EMI

United States Marine Corps

Marine Corps Base Hawaii

Scope

- Bachelor housing and dining facilities
- Hot water from A/C waste heat recovery
- High-efficiency chiller
- Direct Digital Controls

Financing

- $2.3M ESPC financing
- $1.2M Environmental funds (cost avoidance)
- HECO rebates

Status

- Completed ~12/01
- Amortization to 3/08

Bill Nutting - Energy Manager

United States Marine Corps

Marine Corps Base Hawaii

Benefits

- Demolition of 2 large steam plants
- Elimination of 4 boiler watchstander positions
- Avoid $1.2M fuel spill containment costs
- Annual Savings: $60K energy, $306K maintenance, & $218K operations

Lessons

- Think “out of the box”, basic requirements
- Re-use waste energy instead of new energy

Improvements

- Central control and monitoring of energy use

Bill Nutting - Energy Manager

United States Marine Corps

Marine Corps Base Hawaii

Scope

- Lighting retrofit, 49 buildings
- Lighting retrofit, 350 family housing units
- Daylighting controls, 5 hangars
- A/C waste heat recovery, 6 bachelor housing buildings

Financing

- $1.7M ESPC financing
- HECO rebates

Status

- Completed ~10/02
- Amortization to 10/12

Bill Nutting - Energy Manager

United States Marine Corps

Marine Corps Base Hawaii

Benefits

- Better quality, more efficient lighting
- Lighting off when daylighting sufficient
- Recover waste heat for domestic hot water
- $110K annual energy savings

Lessons

- Re-use waste energy instead of new energy
- Include the “obvious” – reduce wattage of lighting controlled where feasible

Improvements

- Central control and monitoring of energy use

Bill Nutting - Energy Manager